

APPENDIX B

Air Quality

Criteria Pollutants - Helicopter Emissions

Helicopter Criteria Pollutant Emission Factors (pounds/hour)

Type	Engine	Piece	HP	Fuel Consumption (gallon/hr)	HC	Nox
Bell 214B	Honeywell T5508D	1	2050	160	0.96	8.74
Bell 407	Rolls-Royce C-47	1	850	45	0.15	3.86

Source: PG&E, October, 2010. Supplement to PG&E application materials.

Note:

Emission factors were obtained from the California Public Utilities Commission (2006).

Emission factors for Bell 214B were derived from the emission factors for Sikorsky S-72 (double T58-GE-5 1,500 hp engines).

Emission factors for Bell 407 were derived from the emission factors for Bell 204/205 (Lycoming T-53-L-11D 1,100 hp engine).

Emission Factors for Approach/Climb-out Modes

Reference:

California Public Utilities Commission (CPUC), 2006. Southern California Edison. Antelope-Pardee 500-kV Transmission Line Project. Environmental Impact Report. Appendix C for Air Quality Calculation.

Helicopter Criteria Pollutant Emissions

Type	Operation hrs/day	HC	Nox
Bell 214B	10	9.6	87.4
Bell 407	10	1.5	38.6
Total		11.1	126.0

GHG Emissions - Helicopters

Helicopter	Average hourly fuel consumption (gallon/hr) ^a	Emission Factors	CO2 Emissions (lb/hr)	Helicopter Usage ^c		CO2 Emissions (tons)
		(lb CO2/gallon) ^b		(hour/day)	days	
Bell 214B	160	18.355	2936.8	4	180	1057
Bell 407	45	18.355	825.975	4	180	297
Total CO2 Emissions From Helicopters						1355

^a Interagency Aviation Training, 2010. Aircraft Identification Library, website (https://www.iat.gov/aircraft_library/index.asp), accessed February 23, 2010 and the U.S. Department of Inter, National Business Center, Aviation Management directive (<http://amd.nbc.gov/akro/akflight/pdf/ex2.pdf>).

^b US Energy Information Administration, Independent Statistics and Analysis, 2010. Voluntary Reporting of Greenhouse Gases Program, Fuel and Energy Source Codes and Emission Coefficients, website (<http://www.eia.doe.gov/oiaf/1605/coefficients.html>), accessed February 23, 2010.

^c Hours per day are averages for the whole construction period.

Construction GHG Emissions Summary

Activity	CO2 Emissions			
	2011 (tons)	2012 (tons)	Max Annual (tons)	Max Annual Total (metric tons)
Hollister Pole Segment Construction	550	--	550	499
Hollister Tower Segment Construction	374	34	374	339
Hollister Substation Upgrades Construction	21	--	21	19
Helicopter Usage	1355	0	1355	1229
Total Construction GHG Emissions	2086			
Amortized Emissions (30 years)	70			

Combined Annual Emissions Reports (Tons/Year)

File Name: G:\207xx\D207584.03 - CPUC Hollister Transmission Line\06 Project Library\Data Responses\Data Response 1\Air Quality\Hollister Urbemis Files_Nov 2009\Hollister pole.urb924

Project Name: Hollister Pole Segment

Project Location: Monterey Bay Air District

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	<u>CO2</u>
2011 TOTALS (tons/year unmitigated)	550.08

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

CO2

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2011 550.08

Fine Grading 01/03/2011-03/04/2011

77.55

Fine Grading Dust

0.00

Fine Grading Off Road Diesel

68.86

Fine Grading On Road Diesel

5.72

Fine Grading Worker Trips

2.97

Fine Grading 02/28/2011-12/30/2011

472.53

Fine Grading Dust

0.00

Fine Grading Off Road Diesel

211.39

Fine Grading On Road Diesel

224.60

Fine Grading Worker Trips

36.54

Phase Assumptions

Phase: Fine Grading 1/3/2011 - 3/4/2011 - Staging Area Preparation

Total Acres Disturbed: 40

Maximum Daily Acreage Disturbed: 2

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 0 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 60

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

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Phase: Fine Grading 2/28/2011 - 12/30/2011 - Hollister Pole Construction

Total Acres Disturbed: 6

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 10 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 802.92

Off-Road Equipment:

- 1 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day
- 1 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day
- 1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day
- 1 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day
- 3 Off Highway Trucks (189 hp) operating at a 0.57 load factor for 8 hours per day
- 13 Other Equipment (0 hp) operating at a 0.62 load factor for 8 hours per day
- 1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Combined Annual Emissions Reports (Tons/Year)

File Name: G:\207xxx\ID207584.03 - CPUC Hollister Transmission Line\06 Project Library\Data Responses\Data Response 1\Air Quality\Hollister Urbemis Files_Nov 2009\Hollister station.urb924

Project Name: Hollister Substation

Project Location: Monterey Bay Air District

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	<u>CO2</u>
2011 TOTALS (tons/year unmitigated)	21.23

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

CO2

2011	21.23
Fine Grading 10/31/2011-11/25/2011	21.23
Fine Grading Dust	0.00
Fine Grading Off Road Diesel	16.20
Fine Grading On Road Diesel	4.24
Fine Grading Worker Trips	0.79



Phase Assumptions

Phase: Fine Grading 10/31/2011 - 11/25/2011 - Hollister Station Construction

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 0

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 0 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 100

Off-Road Equipment:

3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Combined Annual Emissions Reports (Tons/Year)

File Name: \\sfo-file01\PROJECTS\SFO\207xxx\ID207584.03 - CPUC Hollister Transmission Line\06 Project Library\Data Responses\Data Response 1\Air Quality\Hollister Urbemis Files_Nov 2009\Hollister towers.urb924

Project Name: Hollister Tower Segment

Project Location: Monterey Bay Air District

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	<u>CO2</u>
2011 TOTALS (tons/year unmitigated)	374.44

2012 TOTALS (tons/year unmitigated)	34.33
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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

CO2

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2011		374.44
Fine Grading 01/03/2011-02/11/2011		51.70
Fine Grading Dust		0.00
Fine Grading Off Road Diesel		45.91
Fine Grading On Road Diesel		3.81
Fine Grading Worker Trips		1.98
Fine Grading 02/07/2011-02/03/2012		322.74
Fine Grading Dust		0.00
Fine Grading Off Road Diesel		225.80
Fine Grading On Road Diesel		57.91
Fine Grading Worker Trips		39.03
2012		34.33
Fine Grading 02/07/2011-02/03/2012		34.33
Fine Grading Dust		0.00
Fine Grading Off Road Diesel		24.02
Fine Grading On Road Diesel		6.16
Fine Grading Worker Trips		4.15

Phase Assumptions

Phase: Fine Grading 1/3/2011 - 2/11/2011 - Staging Area Preparation

Total Acres Disturbed: 45

Maximum Daily Acreage Disturbed: 2

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 0 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

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On Road Truck Travel (VMT): 60

Off-Road Equipment:

- 1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
- 1 Rollers (95 hp) operating at a 0.56 load factor for 8 hours per day
- 1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
- 1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
- 1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Fine Grading 2/7/2011 - 2/3/2012 - Hollister Tower Construction

Total Acres Disturbed: 2

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 10 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 193.79

Off-Road Equipment:

- 1 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day
- 1 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day
- 1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day
- 1 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day
- 3 Off Highway Trucks (189 hp) operating at a 0.57 load factor for 8 hours per day
- 13 Other Equipment (0 hp) operating at a 0.62 load factor for 8 hours per day
- 1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day